BANNARI AMMAN INSTITUTE OF TECHNOLOGY

Stay Ahead

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Autonomous Institution, Accredited by NAAC With 'A' Grade

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Roll No	7376222IT205
Seat No	330
Project ID	24
Problem Statement	Invigilation duty automation
Stack Allocation	MEVN

1. Introduction:

a) Problem Statement:

In academic institutions, the process of assigning invigilation duties to faculty members for examinations is often managed manually. This manual approach can lead to several issues, including uneven distribution of duties, human errors in scheduling, lack of transparency, and difficulty in accommodating changes or substitutions. Faculty members may experience confusion or conflicts with their schedules, and administrative staff spend significant time and effort coordinating these duties. There is a need for an automated system that can streamline the assignment of invigilation duties, ensuring fairness, accuracy, and efficiency..

b) Scope of project:

- **User Management**:

  Admin interface for managing faculty members and their profiles.Faculty member login for viewing and managing assigned duties.

- **Automated Scheduling**:

  Algorithm to automatically assign invigilation duties based on predefined criteria (e.g., availability, workload balance).Flexibility to handle different types of examinations and schedules.

- **Conflict Resolution**:

  Mechanisms to detect and resolve scheduling conflicts.Options for faculty members to request swaps or substitutions, with approval workflows.

- **Notifications and Alerts**:

  Automated notifications and reminders for faculty members about their assigned duties.Real-time updates on any changes or adjustments to the schedule.

- **Reporting and Analytics**:

  Comprehensive reporting tools for administrators to track duty assignments and overall scheduling efficiency.Analytics to identify patterns and optimize future scheduling processes.

- **Integration Capabilities**:

  Integration with existing institutional systems such as academic calendars, HR systems, and email services.APIs for seamless data exchange with other administrative tools.

- **Security and Access Control**:

  Robust security measures to protect sensitive data.Role-based access control to ensure that only authorized personnel can manage and view scheduling information.

- **User-Friendly Interface**:

  Intuitive and responsive web interface for both administrators and faculty members.Mobile-friendly design to allow access from various devices.

2. Technical Components:

a) Front End:

Vue.js : Vue.js will be used to build the user interface, providing a reactive and component-based architecture for a seamless and intuitive user experience.

b) Back End:

Node.js and Express.js : Node.js and Express.js will serve as the backend framework, providing the server-side logic and APIs required for the application.

c) Data base:

MongoDB : MongoDB will be used as the primary database to store all application data, including user information, schedules, and notifications.

d) API:

Authentication APIs : This API endpoint handles user login by verifying credentials and issuing a JWT token for authenticated access.

User Management APIs : This API endpoint fetches the details of a user, such as their name, email, and roles, using their unique user ID.

Schedule Management APIs : This API endpoint allows the creation of a new invigilation schedule by specifying the date, time, assigned faculty, and exam details.

Notification APIs : This API endpoint returns a list of notifications intended for the authenticated user, indicating messages and their read status.

3. System Overview:

a) Interaction:

1. **Faculty Interaction:**

    - **Registration and Profile Management**: Faculty members can register, log in, and update their profiles, including adding personal details and professional preferences.
    - **Schedule View and Management**: Faculty can view their assigned invigilation schedules, request changes, and manage their availability.
    - **Notification Management**: Faculty receive notifications about new schedule assignments and updates, ensuring they are always informed.

2. **Admin Interaction:**

    - **Admin Registration and Login**: Administrators can register, log in, and manage their accounts with appropriate access controls.
    - **Schedule Management**: Admins can create, update, and delete invigilation schedules, assigning faculty members to specific slots.
    - **User Management**: Admins can manage faculty accounts, approve registration requests, and ensure data accuracy.
    - **Notification System**: Admins can send notifications to faculty regarding schedule assignments and important updates.

b) Capabilities:

1. **User Registration and Authentication:**

    - **Faculty Registration**: Faculty members can sign up, log in, and manage their profiles.
    - **Admin Registration**: Administrators can register, log in, and manage their accounts with proper access controls.

2. **Schedule Management:**

    - **Schedule Creation**: Admins can create new invigilation schedules by specifying dates, times, and faculty assignments.
    - **Schedule Update**: Both faculty and admins can update existing schedules to reflect changes in availability or assignments.
    - **Schedule Deletion**: Admins can delete outdated or incorrect schedules to maintain data accuracy.

3. **Notification System:**

    - **Real-Time Notifications**: Faculty receive real-time notifications about new schedule assignments, changes, and other important updates.
    - **Email Alerts**: Automated email notifications are sent to faculty and admins regarding schedule updates and other critical information.
    - **Dashboard Alerts**: Provide real-time updates on user dashboards about important events and deadlines.

4. **Administrative Functions:**

    - **User Management**: Admins can manage faculty accounts, including resetting passwords and updating profiles.
    - **System Configuration**: Admins can configure system settings, manage data security, and ensure system integrity.
    - **Application Review**: Admins can review, approve, or reject requests for schedule changes or updates.

5. **Data Analytics and Reporting:**

    - **Usage Analytics**: Track user interactions, schedule management trends, and system usage statistics.
    - **Performance Reports**: Generate reports on faculty performance, schedule adherence, and system efficiency.
    - **Feedback Collection**: Gather user feedback to continuously improve system capabilities and user experience.

4. Functional requirements:

a) User Registration and Authentication:

- **User Registration**: The system shall allow faculty members to register using their email and a secure password.
- **Admin Registration**: The system shall allow administrators to create and manage their accounts with appropriate access controls.
- **Login and Logout**: The system shall provide secure login and logout functionality for both faculty members and administrators.

b) Profile Management:

- **Update Profile**: Faculty members shall be able to update their personal information, including contact details and preferences.
- **Password Management**: Users shall have the capability to change their passwords and recover them in case they are forgotten.

c) Schedule Management:

- **Create Schedule**: Admins shall be able to create new invigilation schedules by specifying dates, times, and faculty assignments.
- **Update Schedule**: Faculty members and admins shall be able to update existing schedules to reflect changes in availability or assignments.
- **Delete Schedule**: Admins shall have the capability to delete outdated or incorrect schedules to maintain data accuracy.

d) Notification System:

- **Real-Time Notifications**: Faculty members shall receive real-time notifications about new schedule assignments, changes, and other important updates.
- **Email Alerts**: Automated email notifications shall be sent to faculty and admins regarding schedule updates and other critical information.
- **Dashboard Alerts**: Provide real-time updates on user dashboards about important events and deadlines.

e) Administrative Functions:

- **User Management**: Admins shall be able to manage faculty accounts, including resetting passwords and updating profiles.
- **System Configuration**: Admins shall have the ability to configure system settings, manage data security, and ensure system integrity.
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f) Data Analytics and Reporting:

- **Usage Analytics**: Track user interactions, schedule management trends, and system usage statistics.
- **Performance Reports**: Generate reports on faculty performance, schedule adherence, and system efficiency.
- **Feedback Collection**: Gather user feedback to continuously improve system capabilities and user experience.

5. Exemption Application:

a) Application Form:

- **Form Accessibility**: The system shall provide an easily accessible application form for faculty members to apply for exemptions.
- **Required Fields**: The form shall include required fields such as faculty ID, course details, and reason for exemption.
- **Validation**: The system shall validate the input to ensure all required fields are filled out correctly before submission.

b) Preference Selection:

- **Credit Option**: The system shall allow faculty members to select the option to receive academic credits for their exemption.
- **Reward Points Option**: The system shall allow faculty members to choose to receive reward points instead of academic credits.
- **Selection Confirmation**: The system shall confirm the faculty member's preference selection before final submission.

c) Supporting Documents:

- **Document Upload**: The system shall provide an option for faculty members to upload supporting documents such as course syllabi or relevant certifications.
- **File Formats**: The system shall accept common file formats like PDF, DOCX, and JPEG for supporting documents.
- **Document Validation**: The system shall validate the uploaded documents to ensure they meet the required criteria.

d) Application Submission:

- **Submit Button**: The system shall provide a clearly marked submit button for faculty members to finalize and submit their exemption application.
- **Submission Confirmation**: The system shall provide a confirmation message and email notification upon successful submission of the application.
- **Application ID**: The system shall generate a unique application ID for each submitted application for tracking purposes.

e) Application Tracking:

- **Status Updates**: The system shall allow faculty members to track the status of their exemption application in real-time.
- **Status Notifications**: The system shall send email notifications to faculty members when there is a change in the status of their application.
- **Detailed View**: The system shall provide a detailed view of the application status, including any feedback or additional requirements from the admin.

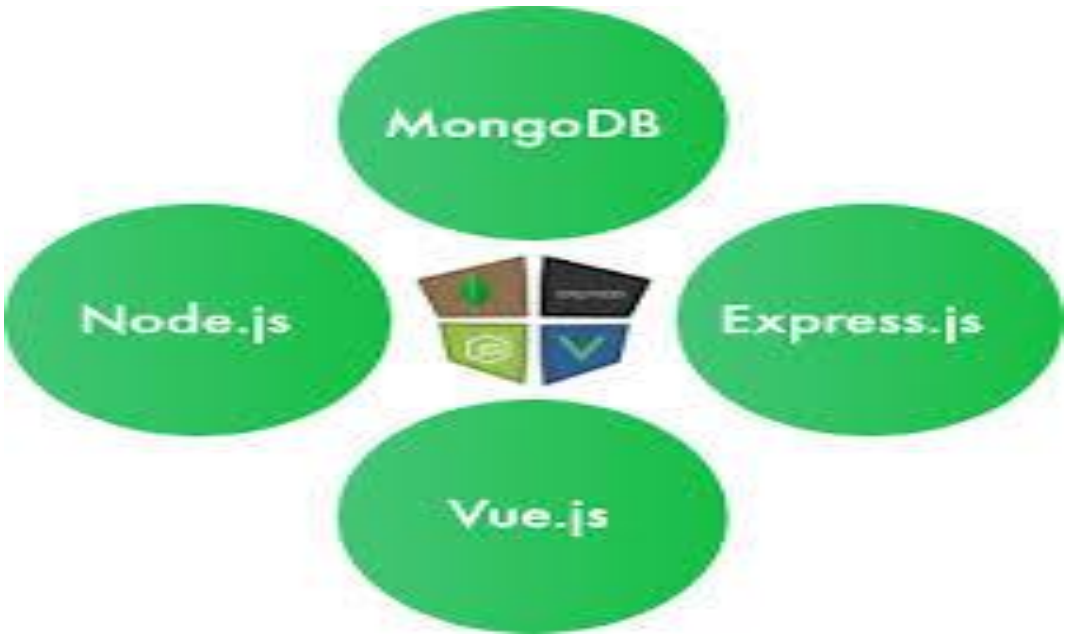
f) Review and Approval:

- **Admin Review**: The system shall allow administrators to review submitted applications, including all attached documents.
- **Approval/Rejection**: Admins shall have the capability to approve or reject applications based on predefined criteria.
- **Feedback to Faculty**: The system shall allow admins to provide feedback or request additional information from faculty members if needed.

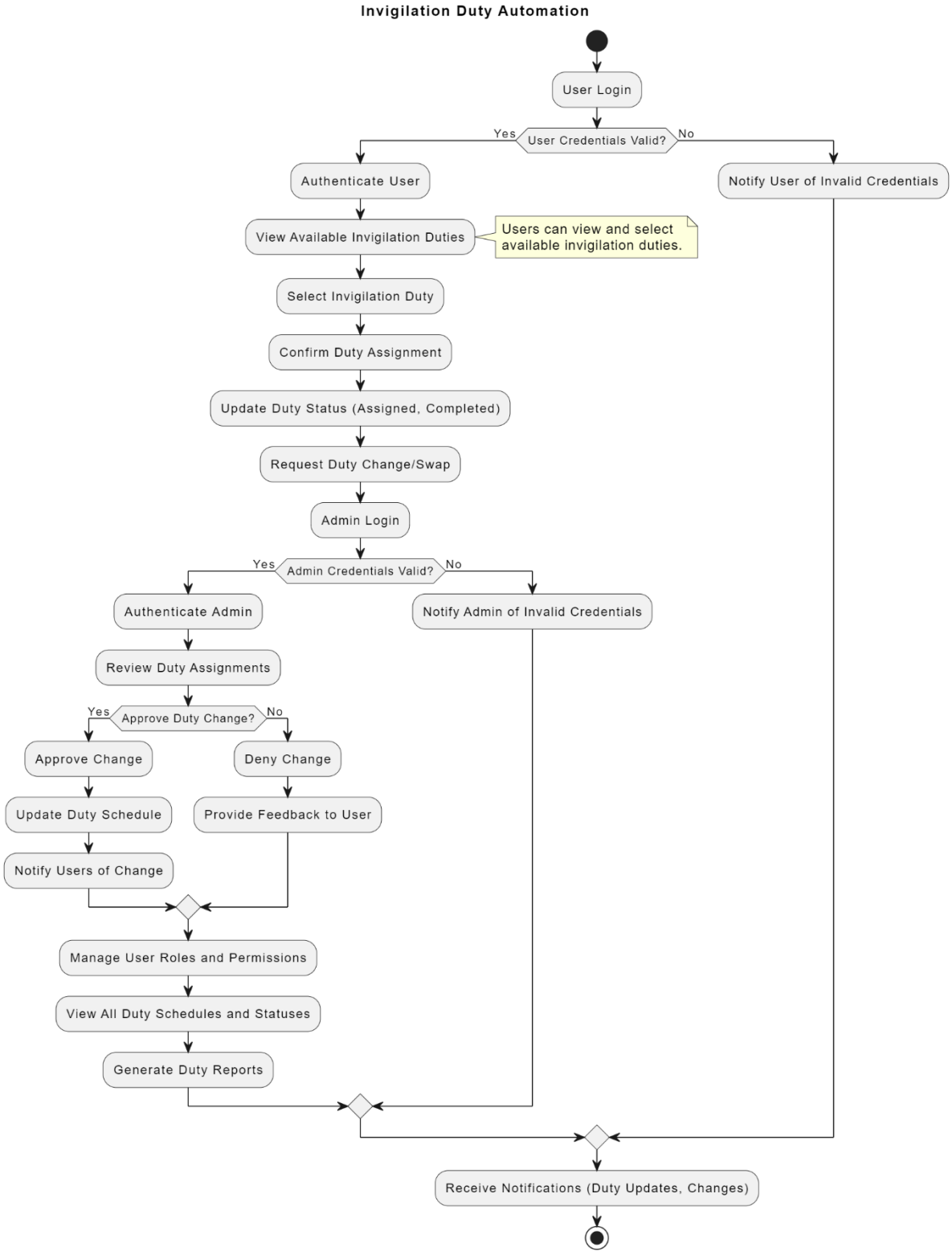
g) Appeal Process:

- **Appeal Submission**: The system shall allow faculty members to submit an appeal if their exemption application is rejected.
- **Appeal Form**: The appeal submission shall include a form where faculty members can provide additional information or clarify previous submissions.
- **Appeal Tracking**: The system shall allow faculty members to track the status of their appeal similar to the initial application process.

6. Technology stack →MEVN



7. FLOWCHART :


Invigilation Duty Automation
User Login
User Credentials Valid?
Yes
No
Authenticate User
Notify User of Invalid Credentials
View Available Invigilation Duties
Users can view and select available invigilation duties.
Select Invigilation Duty
Confirm Duty Assignment
Update Duty Status (Assigned, Completed)
Request Duty Change/Swap
Admin Login
Admin Credentials Valid?
Yes
No
Authenticate Admin
Notify Admin of Invalid Credentials
Review Duty Assignments
Approve Duty Change?
Yes
No
Approve Change
Deny Change
Update Duty Schedule
Provide Feedback to User
Notify Users of Change
Manage User Roles and Permissions
View All Duty Schedules and Statuses
Generate Duty Reports
Receive Notifications (Duty Updates, Changes)